

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 3-18 objected to because of the following informalities: Claims 3-18 depend on claim 1 or 2, the claims should therefore begin with "The method" not with "A method". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4, 19-21, are rejected under 35 U.S.C. 103(a) as being unpatentable over Borden et al (US 3,943,103).
4. Borden discloses a radiation curable composition of one or more polyfunctional polymerizable reactive solvent and, optionally, one or more monofunctional reactive solvent (abstract). Borden discloses "Curing can be with conventional low, medium or high pressure mercury lamps or with a swirl-flow **plasma** arc radiation source by the process. Cure can be carried out in air **or under an inert gas atmosphere e.g., argon, nitrogen**. The time for cure will vary depending upon the particular energy source used, the composition of the coating, the thickness of the film and the surrounding atmosphere conditions. The equipment used in the cure and the conditions under which cure can be conducted are well known to those skilled in the art of radiation technology. Likewise, the time periods required are well known to those skilled in the art and do not require further elucidation" (column 4, line 36).
5. It is noted Borden does not disclose a three-dimensional substrate, however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the curable composition of Borden to a three-dimensional substrate. One of ordinary skill in the art would have been motivated to apply the curable composition of Borden to a three-dimensional substrate when the substrate requires abrasion protection and stain resistance.

***Claim Rejections - 35 USC § 103***

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carder et al. (US 3,939,126).

Carder discloses "Acrylyl-terminated urea-urethane compositions that are the reaction product of an organic polyisocyanate, a hydroxylamine and a hydroxyhydrocarbyl acrylate." (abstract), "A radiation curable composition was produced by mixing 11.43 parts of the above oligomer solution, 3.77 parts of 2(N-methylcarbamoyl)ethyl acrylate, 4.8 parts of neopentyl glycol diacrylate and 0.4 part of a mixture of the n- and iso-butyl ethers of benzoin as photoinitiator. This composition had a Gardner-Holdt viscosity of U. A thin film was coated on the Bonderite No. 37 steel and cured by exposure to the continuum light radiation from an 18 kilowatt argon swirl-flow plasma arc for 0.6 second." (column 3, line 52).

It is noted Carder does not disclose a three-dimensional substrate, however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the curable composition of Carder to a three-dimensional substrate. One of ordinary skill in the art would have been motivated to apply the curable composition of Carder to a three-dimensional substrate when the substrate requires coating with ink that does not require appreciable amounts of volatile solvents that evaporate and pollute the atmosphere and is UV curable.

***Claim Rejections - 35 USC § 103***

6. Claims 5,6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borden et al (US 3,943,103) as applied to claim 1 above and further in view of McGinniss (US 3,847,771).
7. It is noted Borden is silent about component (d) is as described in applicant's claim 5,
8. McGinniss discloses UV curing of polymerizable binders, stating "Typical UV emitters include various electric arc lamps, the plasma arc torch described in U.S. Pat. No. 3,364,387, and lasers having a lasing output in the UV spectrum range such as disclosed in U.S. Ser. No. 189,254. The subject matter of the foregoing references are incorporated herein by reference." (column 1, line 24). McGinniss further teaches "The sensitizer 2,2'-dithiobis-(benzothiazole) becomes synergized when used in combination with aromatic carbonyl photosensitizers such phenyl carbonyl compounds and aromatic amine carbonyl compounds and sometimes referred to in the art as Michler's Ketones. Examples of aromatic amino photosensitizers include: Michler's Ketone [4,4'-bis-(dimethylamino)-benzophenone]; 4,4'-bis-(diethylamino)-benzophenone; p-dimethylaminobenzaldehyde; 4,4'-bis-(dimethylamino)-benzil; p-dimethylaminobenzophenone; p-dimethylaminobenzoin; p-dimethylaminobenzil; N-substituted 9-acridanones; and those amino-aromatic (or phenyl) carbonyl compounds described in U.S. Pat. No. 3,661,588; and p-aminophenyl carbonyl compounds described in U.S. Pat. No. 3,552,973 and said patents are incorporated herein by reference. Aromatic carbonyl photosensitizers are preferably added to the pigmented

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binders in amounts of 0.1 to 2% by weight based on the pigmented-binder system.”  
(column 2, line 48).

9. McGinniss clearly teaches the synergistic sensitizer of his invention (including applicant's formula II) substantially improves a complete room temperature cure by UV or laser energy sources of an ethylenically unsaturated polymer containing inorganics, and Plasma arc torches generate UV.

10. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Borden to include any synergistic sensitizer of McGinniss (including applicant's formula II) because McGinniss teaches the benefits of such synergistic sensitizer.

11. One of ordinary skill in the art would have been motivated to include any synergistic sensitizer of McGinniss in order to substantially improve a complete room temperature cure by UV from a plasma.

***Claim Rejections - 35 USC § 103***

12. Claims 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borden et al (US 3,943,103) as applied to claim 1 above and further in view of McGinniss (US 3,847,771) and Toba (JP 10158039).

13. It is noted Borden is silent about component (d) is as described in applicant's claim 7.

14. McGinniss teaches UV sources can be plasma.

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15. Toba teaches a composition comprising diphenyl(9-anthrylmethyl)sulfonium tetrakis(pentafluorophenyl)borate 3, radically polymerizable compd. Aronix M 1100 40, urethane acrylateUA 306H 20, and tetrahydrofurfuryl acrylate 10 parts and irradiated with UV to give an optical fiber showing no strain. Toba teaches composition containing UV photo initiators as described by applicant's formula (V) are effective coatings.

16. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Borden to include the photo initiators of Toba because Toba teaches the desirability of such photo initiators.

17. One of ordinary skill in the art would have been motivated to use the photo initiators of Toba in order to reduce the amount of strain on the coated surface.

### ***Claim Rejections - 35 USC § 103***

Claims 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borden et al (US 3,943,103) as applied to claim 1 above and further in view of McGinniss (US 3,847,771) and KLINKENBERG (US 2002/0076504)

18. It is noted Borden is silent about component (d) is as described in applicant's claim 8.

19. McGinniss teaches UV sources can be plasma.

20. KLINKENBERG teaches a photoactivatable coating composition comprises a compound containing activated unsaturated group; activated methenyl-containing compound; catalyst in the form of Lewis or Bronsted base(s) with conjugated acids

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having an acid ionization constant of at least 10; and photolatent base as photoinitiator (paragraph 0109) as described in applicant's claim 8.

21. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Borden to include the photolatent base as photoinitiator of KLINKENBERG.

22. One of ordinary skill in the art would have been motivated to modify the process of Borden to include the photolatent base as photoinitiator of KLINKENBERG in order for the composition to be cured by UV radiation without problems in portions e.g. three-dimensional surfaces, that are not readily accessible to UV; or when the presence of pigments does not allow UV radiation to penetrate into lower layers. The composition has low volatile organic components. Problems resulting from oxygen inhibition during irradiation with UV light from fluorescent lamps are eliminated.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAHMOUD DAHIMENE whose telephone number is (571)272-2410. The examiner can normally be reached on week days from 8:00 AM. to 5:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/M. D./

Examiner, Art Unit 1792

/Nadine G Norton/

Supervisory Patent Examiner, Art Unit 1792